Indiana Department of Natural Resources
Division of Forestry
DRAFT
RESOURCE MANAGEMENT GUIDE

Harrison-Crawford State Forest **Compartment: 19 Tract: 5**
Dieter Rudolph, John Segari **Inventory Date: August 10, 2010**

Acres Commercial Forest:	130	Basal Area >= 14 inches DBH: 70.25 sqft/ac
Management Cycle	20	Basal Area < 14 inches DBH: 39.55 sqft/ac
Cutting Cycle	17*	Basal Area Culls: 3.30 sqft/ac
Acres Total: 130		Total Basal Area: 110.41 sqft/ac
		Number Trees/Acre: 216

*based on a 2,000 bdft/acre sale. See prescription on page 9 for details

Species	Harvest Volume(MBF)	Leave Volume(MBF)	Total Volume(MBF)
White Ash	99.41	40.18	139.59
Northern Red Oak	55.36	28.05	83.41
Yellow Poplar	53.45	48.15	101.6
White Oak	44.91	129.05	173.96
Sugar Maple	30.96	53.83	84.79
Shumard Oak	22.43	23.23	45.66
Scarlet Oak	10.3	0	10.3
Chinkapin Oak	9.48	25.47	34.95
American Elm	6.62	0	6.62
Black Oak	6.58	8.97	15.55
Pignut Hickory	6.35	10.4	16.75
Eastern Red Cedar	5.54	0	5.54
Blackgum	4.87	0	4.87
Ohio Buckeye	4.87	0	4.87
American Beech	3.55	0	3.55
American Sycamore	3.11	7.9	11.01
Hackberry	2.98	0	2.98
Shagbark Hickory	1.38	34.79	36.17
Black Walnut	0	24.57	24.57
Silver Maple	0	9.7	9.7
Bitternut Hickory	0	4.44	4.44
Eastern Cottonwood	0	3.88	3.88
Mockernut Hickory	0	3.29	3.29
Boxelder	0	1.5	1.5
Dogwood	0	0	0
Red Maple	0	0	0
Total	372.15	457.4	829.55
Total per acre	2.87	3.52	6.39

Location

This 130 acre tract is located in Harrison County, Indiana. It is mostly in the T4S R2E area comprised mostly of Section 3 with a bit of section 2 in the eastern corner. A small sliver of the northern part of the tract is in T3S R2E, Section 34.

General Description

This tract is located off of Old Forest road in the main body of Harrison Crawford State Forest. It is surrounded on all sides by state land. The majority of the tract is a north facing slope which comes off of Old Forest Road along the southern boundary of the tract. An area of flat land exists in the northwest corner along the Blue River.

There are three Strata within this tract. The smallest stratum is a Bottomland Hardwoods covertype (12 acres) which is located in the flat lowland area in the northwest corner. There is a strip of land, raised in elevation, which splits this stand in two. This stratum is mostly silver maple in the overstory with a large amount of boxelder in the understory. The other species included are those common with this type of stand (cottonwood, sycamore, and ash), as well as some large Shumard oak which have very good form and large sizes.

The middle sized stratum is the Oak Hickory covertype (43 acres) which is found along the middle of the slopes. The dominant species in both volume and basal area in this stratum is white oak by a large margin. Volume wise, the second most prevalent tree is red oak with all other species having a significantly lower volume than these two oaks. There is also a large amount of sugar maple in the understory giving this species a high basal area. Based on the location of this stratum, a lot of the area is sloped with some rock outcrops. The slope is not too severe across the stand but areas do occur where, along with the rocks, equipment limitations might occur.

The last and largest stratum is the Mixed Hardwoods covertype (75 acres) which is found in two areas. This covertype occurs both uphill and downhill of the Oak Hickory covertype which split this stand in two. The section to the south of the Oak Hickory covertype is higher on the hill in an area that had a lower degree slope and less rock outcrops. The area north of the Oak Hickory stand is steeper and rockier with the steepest area being in the west. There is a large level of diversity in terms of species composition. The most prevalent species is white ash with a large amount of sugar maple present in both the overstory and understory. Other species that are common are yellow poplar and white oak. There is an area between the Bottomland Hardwoods stands which is raised slightly in elevation and deemed Mixed Hardwoods. In this area is a group of shumard oaks which were large in size, tall, and of good quality. This species is only present in this area (in the northwest corner of the tract) and was likely left over in the last management activity.

History

The land in this tract was obtained in five segments. The area in the NE ¼ of the NW ¼ of Section 3 as well as the small portion in Section 34 was a part of a 124 acre purchase from Davis in 1977. The area in the N ½ of the NE ¼ of Section 3 was a part of a 234 acre

purchase in 1932 from Hudson. The eastern tip of land in Section 2 was part of a 119 acre purchase in 1932 from Briks. The area in the SE ¼ on the NE ¼ of Section 3 was a part of a 198 acre purchase in 1934. The last portion which was in the SW ¼ of the NE ¼ of Section 3 was a part of a 233 acre purchase from Cole in 1936.

Based on the aerial photos of this area from the 1940s, a majority of the tract was forested in the past. The area that is now the Bottomland Hardwoods stand was previously a field. The raised section of land that ran between the Bottomland Hardwoods stand was also forested in the old photo.

This tract has been inventoried 4 times (1971-McClelland, 1981-Dotzauer, 1990-Bowden, and in 2010-Rudolph). In 1971, there was an estimated 144,203 bd.ft.(1,802.54 bd.ft./acre) in the tract. That year, 49,720 bd.ft. were removed in a managed harvest with the top 4 species (in volume) sold being white oak, red oak, Am. beech, and black oak, respectively. That harvest created at least one regeneration opening mid tract. In 1981, 372,929 bd.ft. (4053.6 bd.ft./acre) were present. In 1990, 660,019 bd.ft.(5,156.4 bd.ft./acre) were indicated to be in the tract. In 1991, an estimated 136,720 bd.ft. were removed in a harvest. This time, the top 4 species removed were black oak, white oak, red oak, and Am. beech.

Topography, Geology, and Hydrology

The majority of this tract is comprised of a north-facing slope. The high area of the tract was along Old Forest Road, the southern boundary of the tract. The northern boundary of the tract is a drainage, marked on maps as a blue line intermittent stream, which drains into the Blue River, the northwestern boundary of this tract. The slopes within this tract are mostly gradual to slightly steep with the exception being some severe slopes in the western portion of the tract.

There was one large sinkhole that existed in this tract in the area of flat land in the northern section of this tract which suggests the presence of underground waterways.

Soils

Corydon Stony Silt Loam (CoF) Shallow, moderately steep to very steep, well-drained, stony soils on uplands. Surface layer is about 3 inches. Subsurface is about 6 inches thick. Subsoil about 9 inches thick. The depth to hard limestone bedrock is about 18 inches. High in organic matter and low in natural fertility. Runoff is rapid or very rapid. Soil type is characterized by limestone outcrops, with as much as 15% on benches which are deeper than 20 inches to bedrock.
Degree Slope: 20-60 %
Woodland Suitability Group: 3d7
Site Index: 65-75 (Upland oaks)
Growth range potential (Upland oaks): 155-220
Management concerns: Runoff and erosion

Crider Silt Loam (CrB2, CrC2, CsB3, CsC3, CtC2) Deep, gently sloping and moderately sloping well-drained soils on uplands. Surface layer is dark-brown silt loam about 8 inches thick. Subsoil is about 62 inches thick. Moderate in content of organic matter and in natural fertility. Available water capacity is high and permeability is moderate. Typically, these soils are eroded. Runoff is medium to rapid.
Degree Slope: 2-12%
Woodland Suitability Group: 1o1
Site Index: 85-95 (Upland Oaks)
Growth range potential (Upland oaks): 300-375 bd.ft./acre/year
Management Concerns: Runoff and erosion

Gilpin Silt Loam (GlD2, GlD3, GlE2, GpF) Moderately deep, strongly sloping to steep, well-drained soils. Surface layer is very dark grayish-brown silt loam about 3 inches thick. Subsurface layer is pale brown silt loam about 9 inches thick. Subsoil is about 17 inches thick. Depth to hard sandstone and shale bedrock is about 29 inches. Moderate in organic matter. Available water capacity is low and permeability is moderate. Runoff is rapid to very rapid.
Degree Slope: 12-30 %
Woodland Suitability Group: 3o10 or 3r12
Growth range potential (Upland oaks): 185-260 bd.ft./acre/year
Site Index: 70-80
Management Concerns: Runoff and erosion

Hagerstown Silt Loam (HaC2, HaD2, HgC3, HgD3, HgE3) Deep, moderately sloping to moderately steep, well-drained soils on uplands. Surface layer is dark yellowish brown silt loam about 6 inches thick. The subsoil is about 46 inches thick. The depth to limestone is about 52 inches. Characteristically, this soil is eroded to severely eroded. Moderate in content of organic matter and medium in natural fertility. Available water capacity is moderate or high, and permeability is moderate. Runoff is rapid to very rapid.
Degree Slope: 6-25 %
Woodland Suitability Group: 1o1 or 1r2
Site Index: 85-95 (Upland Oaks)
Growth range potential (Upland oaks): 300-375 bd.ft. /acre/year
Management Concerns: Runoff and erosion

Haymond Silt Loam (Hm) Deep, nearly level, well-drained soils on bottom lands and in basins of sinkholes in uplands. Surface layer is dark-brown about 9 inches thick. Subsoil dark yellowish-brown about 17 inches thick. Underlying material is dark yellowish-brown stratified silt loam that contains less prominent layers of loam. Moderate in content of organic matter. Available water capacity is high, and permeability is moderate. Runoff is slow.
Degree Slope: 0%
Woodland Suitability Group: 1o8
Site Index: (95-105- no rating for upland oaks)
Growth range potential (Tulip poplar-no rating for oaks): 375-450 bd.ft./acre/year
Management Concerns: Flooding between December and June

Markland Silt Loam (MaB2, MaD2, MaF, McD3) Deep, gently sloping to very steep, well drained and moderately well drained soils on terraces. Surface layer is dark grayish-brown silt loam about 3 inches thick. Subsurface layer is dark-brown silt loam about 4 inches thick. Subsoil is about 23 inches thick. The underlying material is yellowish-brown stratified silty clay and silty clay loam that has less prominent layers of silt loam. Moderate or low in content of organic matter and low in natural fertility. Available water capacity is high, and permeability is slow. Runoff is medium to very rapid.
Degree Slope: 2-70%
Woodland Suitability Group: 3r18
Site Index: 70-80 (Upland Oaks)
Growth range potential (Upland oaks): 185-260 bd.ft./acre/year
Management Concerns: Runoff and erosion

McGary Silt Loam (Mg) Deep, nearly level, somewhat poorly drained soils on terraces. Included with it in mapping were a few small areas of gently sloping eroded soils and areas where there is a loess cap more than 14 inches thick. They formed in calcareous lacustrine material. The native vegetation was mixed hardwoods. The surface layer is grayish-brown silt loam about 8 inches thick. The subsoil is about 37 inches thick. The upper 6 inches is grayish-brown and yellowish-brown firm silty clay loam, and the next 16 inches is yellowish-brown and grayish-brown very firm silty clay. The lower 15 inches is gray very firm silty clay that has dark brown mottles. The underlying material is gray silty clay loam.
Degree Slope: 0-2%
Woodland Suitability Group: 3w5
Site Index: 70-80
Growth range potential (Upland oaks): 185-260 bd.ft./acre/year
Management Concerns: Wetness

Tilsit Silt Loam (TlB2) Deep, gently sloping, modrately well drained soils on uplands. Fragipan in the lower part of the subsoil. Surface layer is dark yellowish-brown silt loam about 8 inches thick. Subsoil is about 38 inches thick. Depth to interbedded shale and sandstone bedrock is about 66 inches. Moderate in content of organic matter and low in natural fertility. Available water capacity is moderate and permeability is very slow. Runoff is medium.
Degree Slope: 2-6 %
Woodland Suitability Group: 3d9
Site Index: 70-80 (Upland Oaks)
Growth range potential (Upland oaks): 185-260 bd.ft./acre/year
Management Concerns: Erosion, wetness early in spring, available water capacity, lack of moisture in mid and late summer if rainfall is below normal.

Weikert-Berks Channery Silt Loam (WbF) Shallow, very steep, well-drained, channery soils on uplands. Surface layer is very dark grayish-brown and dark grayish-brown and about 8 inches thick. Subsoil is about 10 inches thick and is yellowish brown channery heavy silt loam and 35-50 % sandstone rock fragments. Depth to the interbedded hard sandstone and shale is about 18 inches. Moderate in content of organic matter and low in available natural fertility. Available water capacity is very low, and permeability is moderately rapid. Runoff is very rapid.
Degree Slope: 35-60 %
Woodland Suitability Group: 5r14
Site Index: 45-53 (Virginia pine-no rating for hardwoods)
Growth range potential (Virginia or shortleaf pine-no rating for hardwoods): 75-200 bd.ft./acre/year

Wellston Silt Loam (WeC2, WeC3, WeD2, WeD3) Moderately deep and deep, moderately sloping and strongly sloping, well draineds soils on uplands. Surface layer is about 9 inches thick and yellowish-brown. The subsoil is about 31 inches thick. Depth to hard sandstone bedrock is about 40 inches. Moderate in content of organic matter and low in natural fertility. Available water capacity is moderate or high, and permeability is moderate. Runoff ranges from medium to very rapid.
Degree Slope: 6-18 %
Woodland Suitability Group: 3o10
Site Index: 70-80 (Upland oaks)
Growth range potential (Upland oaks): 185-260 bd.ft./acre/year
Management Concerns: Runoff and erosion

<u>Zanesville Silt Loam</u> (ZaC2, ZaC3, ZaD2) Deep, moderately sloping and strongly sloping, well-drained soils on uplands. Avery firm fragipan in the lower part of the subsoil. Surface layer is very dark grayish-brown silt loam about 3 inches thick. The subsurface layer is about 5 inches thick and dark yellowish-brown. Subsoil is about 42 inches thick. The depth to sandstone bedrock is about 65 inches Moderate or low in content of organic matter and low in natural fertility. Available water capacity is high, and permeability is very slow. Runoff is medium to rapid.
Degree Slope: 6-18%
Woodland Suitability Group: 3d9
Site Index: 70-80 (Upland Oaks)
Growth range potential (Upland oaks): 185-260 bd.ft./acre/year
Management Concerns: Runoff and erosion. Fragipan limits the available water capacity.

Access

This tract has good external access. The previous sales were yarded at the pull-off on the north side of the campground road prior to, north of, the Sassafras shelter and at an opening on the west side of Firetrail 204. Internal access is also good. The yarding locations both have established skid trails and shelves on the hill slope that run the length of the tract.

Boundary

Most of the boundaries of this tract are easily definable. The southern boundary is comprised of the campground (O'bannon Woods State Park) road. The intermittent stream defines the northern boundary. The Blue River runs along the northwestern boundary. The southwestern boundary is the one that is not as easily defined. A small drainage runs along this boundary. This drainage is more evident in the field but is more difficult to determine based on the topographical maps.

Wildlife

Nearly all of the maintenance level wildlife goals were met for this stand. Only one maintenance goal was not met, that being snags with a diameter between 5" and 9". Any management activities that come through this area would likely improve the habitat based on snags by girdling trees that are showing poor growth and creating competition in the stand. Any management activities should also focus on leaving trees that have cavities in them that appear to being used by wildlife as a den tree.

The wildlife that was noted during the inventory was typical with other areas in Harrison County. Evidence of deer, turkey, coyotes, squirrels, raccoons, and various birds were noted during the inventory. The oak and hickory component of the tract acts as a hard mast food source for the wildlife while the diversity in species composition in the Mixed Hardwoods stand creates different types of habitats for different wildlife species. The Bottomland Hardwoods stand was once a field and still shows old-field characteristics such as a brushy understory which in turn increases habitat diversity throughout the tract.

Wildlife Habitat Feature (Tract Wide)

Category	Maintenance level	Optimal Level	Inventory	Available Above	Available Above

				maintenance	Optimal
Legacy Trees *					
11"+	1170		4242	3072	
20"+	390		1224	834	
Snags (all species)					
5"+	520	910	460	-60	-450
9"+	390	780	460	70	-320
19"+	65	130	107	42	-23

* species include: AME, BIH, BLL, COT, GRA, REO, POO, REE, SHH, ZSH, SIM, SUM, WHA, WHO

Indiana Bat

Any skid trails/haul roads created in this tract could improve the habitat for the Indiana bat by improving the canopy foraging conditions due to the reduction of understory clutter. Furthermore, the areas around likely roost trees can be opened up to benefit the bat. The edge of log yards can increase the solar exposure of roost trees which improves the microclimate and thermal conditions of the roosting areas.

Trees that are ideal for roosting bats such as large snags and large trees that have loose/exfoliating bark can be retained to provide for the Indiana bat. Furthermore, the growth of ideal tree species for the Indiana bat can be managed to promote growth to increase the recruitment of trees into the categories suitable for the Indiana bat. Now this tract meets most of the maintenance goals for Indiana. The methods described in the previous section can be used to improve bat habitat as well.

RTE Species

A Natural Heritage Database Review is part of the management planning process. If Rare, Threatened or Endangered species were identified for this area, the activities prescribed in this guide will be conducted in a manner that will not threaten the viability of those species.

Cultural

Cultural resources may be present, but their location(s) are protected. Adverse impacts to significant cultural resources will be avoided during management or construction activities

Recreation

As this tract is located in the main body of Harrison Crawford State Forest and in close proximity to O'Bannon Woods State Park, this area receives higher levels of recreation. This tract has two trails in it, which both appear to undergo frequent use. The Adventure Hiking Trail and a newer mountain bike trail runs through a portion of this tract. Due to the easy accessibility, hunters also utilize this tract in the fall. The trails both cross management boundaries from the park to the forest and as such provide an excellent opportunity to educate the public about forest management and the difference between active management and the inactive management exemplified by the adjacent park. The local mountain bike group has already agreed to assist with trail relocation and rehabilitation.

Invasives

During the inventory, several invasives were found. Being in a high recreation area, this is not unusual. Most instances were near trails or roads. Ailanthus was found near the hiking

trail in some small canopy gaps. A few stems of ailanthus that were found near the bike trail were treated with herbicide ca. 2009. Garlic mustard was found in the transition zone between the Bottomland and the Mixed Hardwoods. The ailanthus should be more accurately mapped during marking and treated prior to the harvest.

Summary Tract Silvicultural Description, Prescription, and Proposed Activities

This tract has benefited from more frequent inventories (4 over 40 years) than most on this State Forest. Unfortunately, the first 2 inventories, 1971 and 1981 are not totally reflective of the tract in its current arrangement. A portion of the tract was acquired in 1977, an addition that appears not to have been considered in the 1981 inventory, and obviously, the 1971 effort. However, the inventory in 1990 (showing 660,018 bdft), a harvest in 1991 (removing 136,267 bdft), and a subsequent inventory in 2010 (showing 829,550 bdft) should be usable for calculating growth. This results in a growth figure of 118 bdft/acre/yr for the tract as a whole.

Mixed Hardwoods (75 acres)

This stratum takes up a majority of the tract and is the most diverse in terms of species composition. Multiple hardwood species are found within the covertype with the most prevalent being white ash, yellow poplar, and sugar maple with a dominantly sugar maple understory. Oaks and hickories were also common throughout the stratum with some scattered black walnut individuals .

The stratum has now reached a density where competition will stress the trees leading to poor growth, poor form, and/or mortality. The basal area of the stratum is 112 sqft/ac with a total volume of 6,600 bdft/ac. Due to the high basal area and volume, this covertype would benefit from a harvest focusing on the removal of less desirable individuals based upon form, vigor, and overall species composition. The white ash should be largely eliminated due to their large size and the eventual spread of the emerald ash borer into the area (estimated to be here by 2020). This invasive insect prefers larger ash trees as a food source for their young. By removing the large ash trees, we will be limiting the habitat and food of the beetle and hopefully aid in keeping the overall population lower for this and the surrounding areas. The proposed harvest would remove roughly a third of the basal area and half of the volume and will leave the stratum closer to that of an oak hickory covertype, which was historically the covertype of most of southern Indiana. The stocking will go from 105% to approximately 65%. Openings in this area should target the either the conversion of ash sites to other hardwoods or should remove areas of poor form or low stocking.

The raised area between the Bottomland Hardwoods covertype had a group of large Shumard oaks that were tall and straight in form. These trees were likely skipped over in the last harvest and should be reassessed for removal in this harvest and managed to retain this species component within the tract.

There is an area of equipment limitations within the Mixed Hardwoods stand along the western portion of the tract. This area was steeper than the rest of the tract and had rock outcrops on the slopes. This degree of slope will likely be impassable by heavy equipment making most of the area better kept in reserve. The ridge runs down into the flat land and

from there the low levels of the western portion can be accessed so the only limitation is within the area of steep slopes.

As mentioned earlier, this tract is utilized by recreationists with the Adventure Hiking Trail and a mountain bike trail going through it. The marker should keep the aesthetic quality of the area in mind when marking trees for removal, including reduced marking within close proximity to the trail and keep a handful of large trees (except for white ash) along the trail as many users find larger trees to be aesthetically pleasing. Placing multiple signs along the trail to inform the users why a harvest is being performed, what the goals of the harvest are, and what the forest will be like after the harvest. Signage and information should be made visible for an extended period of time PRIOR to the harvest operation to allow users to adjust and provide comments. Being a high recreation area near the unmanaged forests of the state park provides a unique opportunity to show the public the difference between an unmanaged and managed forest.

Oak-Hickory (43 acres)

This stratum is located mainly along the middle of the slope across the tract. The main species are red and white oaks, with some white ash. This stratum is less dense than that of the Mixed Hardwoods covertype with a basal area of 100 sqft/ac and a volume of 7,000 bdft/ac.

While the area is not as dense, it is still reaching the point where competition will begin degrading the stand. As there will not likely be another harvest in the area for a number of years after the one prescribed, this stratum should also be thinned. Red oaks present throughout the stand have also reached maturity and as a result will only decrease in volume and vigor in the future. White oak volume should be reduced by a 25% while still maintaining over 2,400 bdft/acre.

This sratum has some gaps that are developing. If these gaps have established oak regeneration in or near them, openings of at least 1 acre in size should be installed. Openings should target releasing regeneration or converting areas of white ash to other hardwoods.

Bottomland Hardwoods (12 acres)

This small area was previously a field, as can be seen on the aerial photos from the 1940s. As a result of it being a field, the understory is still mostly boxelder. There is an overstory layer which is mainly silver maple with a handful of other species making appearances, but overall the boxelder understory is outcompeting the other species. Due to the small size and the small amount of volume (with the exception of some large sycamore and silver maple trees along the Blue River), this stand was not recorded as having any harvestable volume. This stratum would benefit from TSI. TSI will focus on controlling vines and thinning the Boxelder to allow other species to establish. This will increase species diversity as well as contribute additional snags in a riparian area. TSI should also include checking for occasional black walnut and releasing from competition if needed.

Prescription Summation

This plan calls for a thinning in the Mixed Hardwoods and Oak-Hickory strata of this tract. Of the 130 acres in the tract, approximately 28 acres, 22%, will be held in reserve (no treatment at this time). These areas will be in the bottomland and steep areas. The tract should receive up to 9 acres of regeneration openings. This will create age and structural diversity. Openings should be focused in the oak-hickory stratum on areas of advanced regeneration or groups of ash trees and should be at least acre to provide for the establishment of intolerant and midtolerant species. In the Mixed Hardwood stratum, the openings should be focused on removing over-mature and poorly formed trees or converting ash sites. Openings here may be as small as .5 acres and as large as needed. This will allow additional tolerant stems to move into the main canopy. The Bottomland Hardwood Stratum should be assessed for inclusion in post harvest TSI when the harvest operation is complete.

This should result in a sale volume of approximately 250-350 MBF. This is lower than the total in the inventory due to visual buffers for trails and roads as well as the bottomland and steep areas. The inventory calls for a reduction in stocking from 97% to 67%, still a fully stocked stand. The buffers and reserve areas will result in an effective stocking level much higher tract wide than 67%.

Given the large recreational pressure that this tract receives, limiting the logging to a single season instead of the typical 2 will limit interference with other uses. In addition, the educational signage should go up early but the visual impact of the marking and flagging should be delayed as long as possible by marking late in the spring or early summer.

TRACT ACCOMPLISHMENT RECORD
Compartment 19, Tract 5

DATE PLANNED	ACTIVITY / REMARKS	DATE COMPLETED
2013-14	Check earlier ailanthus control efforts and treat if needed	2013
2014	Timber harvest	
2015-16	Post harvest TSI, emphasis on opening completion and exotics control (if necessary)	
2020	Visit regeneration opening(s) to evaluate regeneration success	
2020	Visit tract to check for exotics. Map and treat if needed	
2030	Re-enter for inventory	

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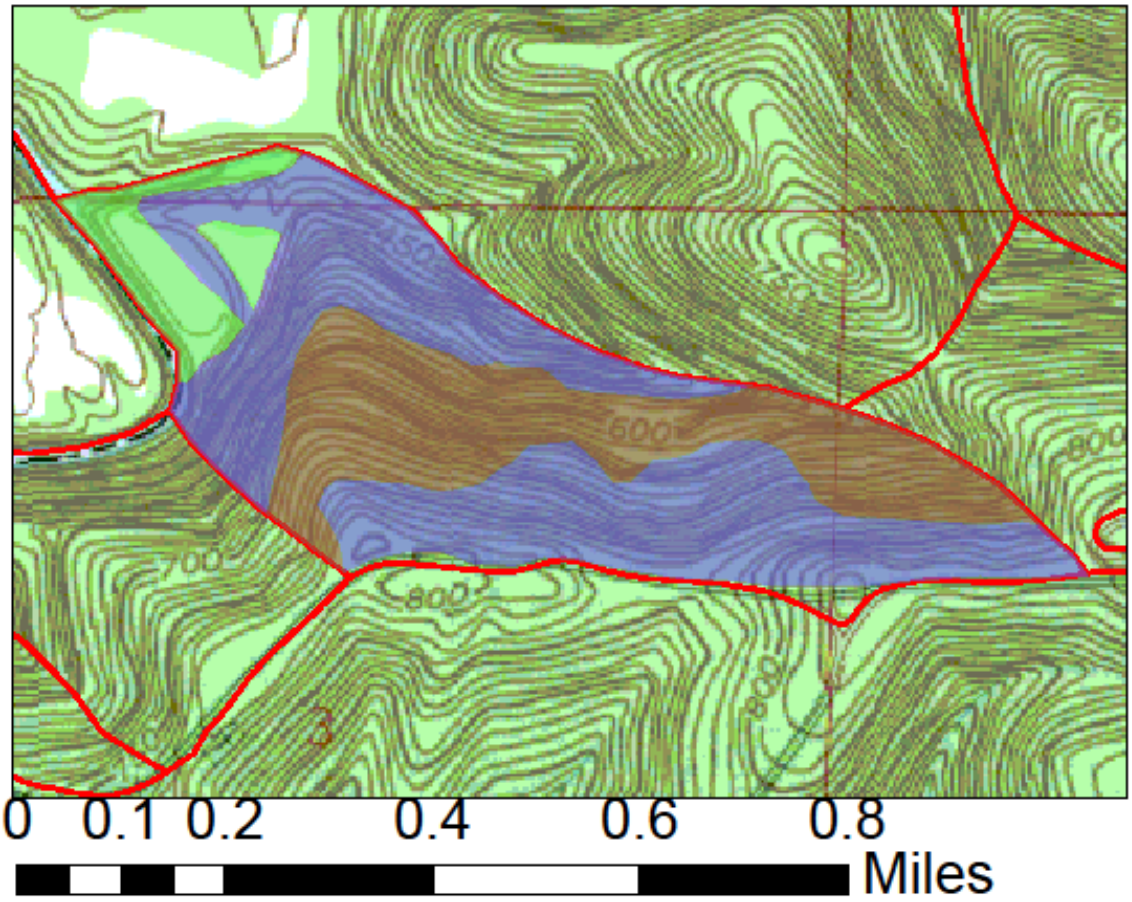
Harrison Crawford State Forest
Compartment 19 Tract 5



Legend

stands

- Bottomland Hardwoods
- Mixed Hardwoods
- Oak-Hickory

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